

CLAIMS

We claim:

- [c1] 1. A vehicle and load warning system, comprising:
- a vehicle having a load-support portion adapted to receive a load thereon, a frame coupled to the support portion, and a vehicle-support portion coupled to the frame, the frame being movable relative to the vehicle-support portion;
 - an engagement portion movable with the one of the vehicle-support portion or the frame;
 - a load indicator coupled to the other one of the vehicle-support portion or the frame, the load indicator spaced apart from the engagement portion when in a first position and configured to move to a second position and engage the engagement portion when the frame moves a selected distance relative to the vehicle-support portion in response to the load being applied to the load-support portion, the load indicator having a switch assembly and a trigger coupled to the switch assembly, the trigger being resiliently bendable against the engagement portion after the load indicator is moved to the second position; and
 - a warning indicator coupled to the load indicator and configured to provide an overload warning to a user in response to the load indicator moving to the second position.
- [c2] 2. The system of claim 1 wherein the engagement portion is at least a portion of a bracket attached to the one of the vehicle-support portion or the frame.

- [c3] 3. The system of claim 1 wherein the frame is rotatable relative to the vehicle support about an axis of rotation when the load is rearward of the axis of rotation, and at least one of the engagement portion and the load indicator is positioned rearward of the axis of rotation.
- [c4] 4. The system of claim 1 wherein the vehicle support portion includes a rear axle assembly, and at least one of the engagement portion and the load indicator is mounted to the rear axle assembly, and the other of engagement portion and the load indicator is positioned generally rearward of the rear axle assembly.
- [c5] 5. The system of claim 1 wherein the load indicator includes a mounting bracket attached to the other one of the vehicle-support portion or the frame, and the switch assembly is adjustably attached to the mounting bracket.
- [c6] 6. The system of claim 1 wherein the vehicle has a power source, the load indicator is coupled to the power source and draws power from the power source only when the load indicator is in the second position.
- [c7] 7. The system of claim 1, further comprising a data collector coupled to the vehicle and configured to collect and output data including at least one of time, date, load, activation of the warning indicator, and duration of use of the system.
- [c8] 8. The system of claim 1 wherein the overload warning is an audible warning.
- [c9] 9. The system of claim 1 wherein the overload warning indicator is a visual indicator.

- [c10] 10. The system of claim 1 wherein the warning indicator includes a horn, and the signal from the load indicator activates the horn to provide the overload warning to the user.
- [c11] 11. The system of claim 1 wherein the vehicle has an electrical control with a starter relay, and further comprising a relay assembly coupled to the load indicator and to the starter relay.
- [c12] 12. The system of claim 11 wherein the relay assembly is configured to allow for generation of the overload warning when the vehicle is in a park or neutral gear condition.
- [c13] 13. The system of claim 1, further comprising a control system coupled to the load indicator and to the warning system, the control system being configured to monitor a frequency or duration of the signals from the load indicator and to block the signal from reaching the warning indicator until a selected condition of frequency or duration of the signals exists.
- [c14] 14. The system of claim 1 wherein the load-support portion of the vehicle is a rear axle coupled to the frame by a suspension system.
- [c15] 15. A vehicle and load warning system, comprising:
a vehicle having a load-support portion adapted to receive a load thereon,
a frame coupled to the support portion, and a vehicle-support
portion coupled to the frame, the frame being vertically movable
relative to the vehicle support portion and being rotatable about a
point of rotation relative to the vehicle support portion;
an engagement portion movable with the one of the vehicle-support portion
or the frame;

a load indicator coupled to the other one of the vehicle-support portion or the frame, the load indicator spaced apart from the engagement portion when in a first position and configured to move to a second position and engage the engagement portion when the frame moves vertically and rotationally a selected distance relative to the vehicle-support portion in response to the load being applied to the load-support portion, the load indicator having a switch assembly and a trigger member coupled to the switch, the trigger member being directly engagable with the engagement portion; and

a warning indicator coupled to the load indicator and configured to provide an overload warning to a user in response to the load indicator moving to the second position.

[c16] 16. The system of claim 15 wherein the engagement portion is at least a portion of a bracket attached to the one of the vehicle-support portion and the frame.

[c17] 17. The system of claim 15 wherein the load indicator includes a switch and a flexible trigger member coupled to the switch and resiliently bendable against the engagement member after the load indicator is moved to the second position.

[c18] 18. The system of claim 15 wherein the load indicator includes a mounting bracket attached to the other one of the vehicle-support portion or the frame, and the switch assembly is adjustably attached to the mounting bracket.

[c19] 19. The system of claim 15 wherein the overload warning is an audible or visual warning.

- [c20] 20. The system of claim 15 wherein the vehicle has an electrical control with a starter relay, and further comprising a relay assembly coupled to the load indicator and to the starter relay
- [c21] 21. The system of claim 20 wherein the relay assembly is configured to allow for generation of the overload warning when the vehicle is in a park or neutral gear condition.
- [c22] 25. The system of claim 16, further comprising a control system coupled to the load indicator and to the warning system, the control system being configured to monitor a frequency or duration of the signals from the load indicator and to block the signal from reaching the warning indicator until a selected condition of frequency or duration of the signals exists.
- [c23] 23. The system of claim 15 wherein the load-support portion of the vehicle is a rear axle coupled to the frame by a suspension system.
- [c24] 24. The system of claim 15 wherein the vehicle has a power source, the load indicator is coupled to the power source and draws power from the power source only when the load indicator is in the second position.
- [c25] 25. The system of claim 15, further comprising a data collector coupled to the vehicle and configured to collect and output data including at least one of time, date, load, activation of the warning indicator, and duration of use of the system.
- [c26] 26. A vehicle and load warning system, comprising:
 a vehicle having a load-support portion adapted to receive a load thereon,
 a frame coupled to the support portion, and a vehicle-support

portion coupled to the frame, the frame being movable relative to the vehicle support portion;

an engagement portion movable with the one of the vehicle-support portion or the frame;

a load indicator coupled to the other one of the vehicle-support portion or the frame, the load indicator spaced apart from the engagement portion when in a first position and configured to move to a second position and engage the engagement portion when the load applied to the load-support portion exceeds a first maximum load, and the load indicator is configured to move to the second position and engage the engagement portion when the load applied to the load-support portion exceeds a second maximum load less than the first maximum load and the load is positioned rearward of the at least one of the load indicator and the engagement portion; and

a warning indicator coupled to the load indicator and configured to provide an overload warning to a user in response to the load indicator moving to the second position.

[c27] 27. The system of claim 26 wherein the vehicle has a power source, the load indicator is coupled to the power source and draws power from the power source only when the load indicator is in the second position.

[c28] 28. The system of claim 26 wherein the load indicator includes a switch and a flexible trigger member coupled to the switch and resiliently bendable against the engagement member after the load indicator is moved to the second position.

[c29] 29. The system of claim 26 wherein the overload warning is an audible or visual warning.

[c30] 30. The system of claim 26 wherein the vehicle has an electrical control with a starter relay, and further comprising a relay assembly coupled to the load indicator and to the starter relay.

[c31] 31. The system of claim 30 wherein the relay assembly is configured to allow for generation of the overload warning when the vehicle is in a park or neutral gear condition.

[c32] 32. The system of claim 26, further comprising a control system coupled to the load indicator and to the warning system, the control system being configured to monitor a frequency or duration of the signals from the load indicator and to block the signal from reaching the warning indicator until a selected condition of frequency or duration of the signals exists.

[c33] 33. A load warning system for use with a vehicle having a load-support portion adapted to receive a load thereon, a frame coupled to the load-support portion, and a vehicle-support portion movably coupled to the frame, comprising:
an engagement portion mountable to one of the vehicle-support portion and the frame and being movable with the one of the vehicle-support portion and the frame as a unit;
a load indicator mountable to the other one of the vehicle-support portion or the frame, the load indicator spaced apart from the engagement portion when in a first position and configured to move to a second position and engage the engagement portion when the frame moves a selected distance relative to the vehicle-support portion in response to the load being applied to the load-support portion, the load support portion having a switch assembly and a trigger coupled to the switch assembly, the trigger being resiliently bendable against the engagement member after the load indicator is moved to the second position; and

a warning indicator coupled to the load indicator and configured to provide an overload warning in response to the load indicator moving to the second position.

[c34] 34. The system of claim 33 wherein the engagement portion is at least a portion of a bracket mounted on the one of the vehicle-support portion and the frame.

[c35] 35. The system of claim 33 wherein the load indicator is connectable to a power source and draws power from the power source only when the load indicator is in the second position.

[c36] 36. The system of claim 33 wherein the load indicator includes a sealed housing, a switch in the sealed housing, and a flexible trigger resiliently bendable against the engagement member after the load indicator is moved to the second position. 36. The system of claim 33 wherein the load indicator includes a mounting bracket attached to the other one of the vehicle-support portion and the frame, and the switch assembly is adjustably attached to the mounting bracket.

[c37] 37. The system of claim 33 wherein the overload warning is an audible or visual warning.

[c38] 38. The system of claim 33 wherein the warning indicator includes at least one of an audible indicator and a visual indicator.

[c39] 39. The system of claim 33 wherein the vehicle has an electrical control with a starter relay, and further comprising a relay assembly coupled to the load indicator and to the starter relay, the relay assembly configured to allow for generation of the overload warning when the vehicle is in a park or neutral gear condition.

[c40] 40. The overload warning system of claim 33, further comprising a control system coupled to the load indicator and to the overload warning system, the control system configured to monitor at least one of the frequency or duration of the signals from the load indicator and to block the signal from reaching the overload warning indicator until a selected condition of frequency or duration of the signals exists.

[c41] 41. A load warning system for use with a vehicle having a load-support portion adapted to receive a load thereon, the vehicle having a first portion coupled to the load support portion and a second portion movable relative to the first portion upon application of the selected load on the load-support portion, comprising:

- an engagement portion movable with the one of the vehicle-support portion and the frame;

- a load indicator coupled to the other one of the vehicle-support portion and the frame, the load indicator spaced apart from the engagement portion when in a first position and configured to move to a second position and engage the engagement portion when the load applied to the load-support portion exceeds a first maximum load, and the load indicator is configured to move to the second position and engage the engagement portion when the load applied to the load-support portion exceeds a second maximum load less than the first maximum load and the load is positioned rearward of the at least one of the load indicator and the engagement portion; and

- a warning indicator coupled to the load indicator and configured to provide an overload warning to a user in response to the load indicator moving to the second position.

[c42] 42. The system of claim 41 wherein the engagement portion is a bracket adjustably mounted on the one of the first or second portions.

- [c43] 43. The system of claim 41 wherein the load indicator includes a trigger resiliently bendable against the engagement member after the load indicator is moved to the second position.
- [c44] 44. The system of claim 41 wherein the load indicator includes a mounting bracket and a switch assembly adjustably attached to the mounting bracket.
- [c45] 45. The system of claim 41, further comprising a control system coupled to the load indicator and to the warning indicator, the control system being configured to monitor the frequency or duration of the signals from the load indicator and to block the signal from reaching the warning indicator until a selected condition of frequency or duration of the signals exists indicating an overload condition.
- [c46] 46. A vehicle and overload warning system, comprising:
a vehicle having a power source, a load-support portion adapted to receive a load thereon, a first portion coupled to the support portion, and a second portion movable relative to the first portion upon application of the load on the load-support portion;
an engagement portion connected to one of the first and second portions;
a load indicator coupled to the power source and connected to the other one of the first and second portions, the load indicator spaced apart from the engagement portion and in a first position when the load on the load-support portion is less than a maximum load, and the load indicator being configured to engage the engagement portion and to move to a second position when the load on the load-support portion is greater than the maximum load, the load indicator drawing power from the power source when in the second position and drawing no power from the power source when in the first position; and

a warning indicator coupled to the load indicator and configured to provide an overload warning to a user in response to the load indicator moving to the second position.

[c47] 47. The system of claim 46 wherein the load indicator is a switch assembly having a trigger resiliently bendable against the the engagement member after moving to the second position.

[c48] 48. The system of claim 46 wherein the load indicator is adjustably mounted to the other one of the first and second portions of the vehicle.

[c49] 49. The system of claim 46 wherein the warning indicator generates at least one an audible overload warning and a visible overload warning.